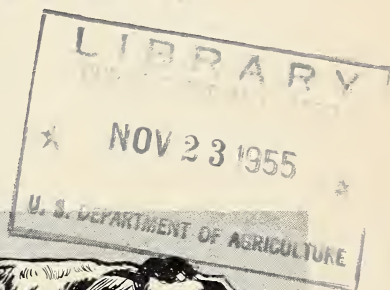


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Automatic Livestock Waterers



LEAFLET NO. 395

U. S. DEPARTMENT OF AGRICULTURE

Automatic livestock waterers that are kept ice-free in winter by electric heating elements reduce costs and increase production. They are rapidly replacing watering tanks and troughs on farms in regions where temperatures often go below freezing.

Automatic waterers insure a constant supply of fresh water. They relieve the farmer of the task of hauling or carrying water to livestock. The electric heating elements relieve him of the task of chipping ice out of tanks or tend-

ing some other kind of water heater during freezing weather.

In cooperative tests at the Iowa Agricultural Experiment Station, hogs that drank from automatic waterers gained 10 pounds more per animal in 6 winter weeks than hogs watered twice daily. In other tests by the Iowa station cows that were watered automatically drank 18 percent more water and gave 3.5 percent more milk than cows watered twice daily; moreover, the milk given by the higher-producing cows tested 10.7 percent higher in butterfat.

Automatic Livestock Waterers

Automatic, electrically heated livestock waterers are made in many shapes and sizes for all types of livestock. Basically, a unit consists of a water tank fed by pressure or a gravity water system, a float valve, a heating element controlled by a thermostat, and housing to support the tank and exclude outside air.

Common kinds are: (1) General-purpose bowl-type waterers, (2) hog waterers, (3) cattle waterers, and (4) combination cattle and hog waterers.

Combination waterers have a tank about 26 inches above ground level for cattle, and a trough at a lower level for hogs.

SELECTION

Following are points to consider in purchasing an automatic, electrically heated livestock waterer.

Size

Buy the smallest unit that will provide ample water for your livestock at all times.

A general-purpose bowl-type waterer will handle up to 30 head of cattle or 60 hogs. A large combination waterer will handle up to 150 head of cattle and 250 hogs.

Heating Element

Select a unit that has the heating element immersed in the water of

the tank or one that has the heating element attached to the underside of the tank. These types usually are more efficient than those that warm the space enclosed by the housing.

Be sure that the heating element is moisture resistant. If moisture is drawn into the heating element, it corrodes the resistance wire. Corrosion of this wire is a common cause of heater failure.

Select a unit that has a heating element for each tank. It is not advisable to use one large element to heat both tanks of a combination waterer.

Thermostat

Choose a waterer equipped with a thermostat that has a small operating range. A thermostat that has a 5° range between the on and off operating points is more efficient than one that has a 10° range.

The thermostat should be designed to prevent the entrance of water.

Each of the troughs in a combination waterer should have a thermostat.

Insulation

Choose a cattle or combination waterer that is insulated with glass wool or other insulating material. Insulation on the sides of a waterer reduces the amount of electricity used.

Covers

Choose a cattle waterer equipped with a cover that can be placed over unused sections. A cover reduces heat loss and the amount of electricity used. A cover on a hog waterer helps keep the water clean and conserves heat.

Cleaning Aids

Select a waterer that can be cleaned easily—one that is equipped with a drain or a dumping device.

INSTALLATION

Following are points to consider in installing automatic livestock waterers.

Location

To provide water for animals in two or more lots, place the waterer in a fenceline.

Waterers in protected locations—back of a windbreak, under a shed, or in a barn—use less electricity than those in the open.

Install the waterer near existing water pipes and electric lines, if possible.

Base for Waterer

To prevent mudholes near the waterer, mount the waterer on a concrete base not less than 6 feet square. Place a coarse gravel fill under and around the base.

Water Pipes

Install the connecting water pipes below the frost line. Bring the riser pipe to the surface through a 6- to 12-inch tile extending down 3 feet below the frostline.



Covered, insulated hog waterer.



Combination cattle and hog waterer.

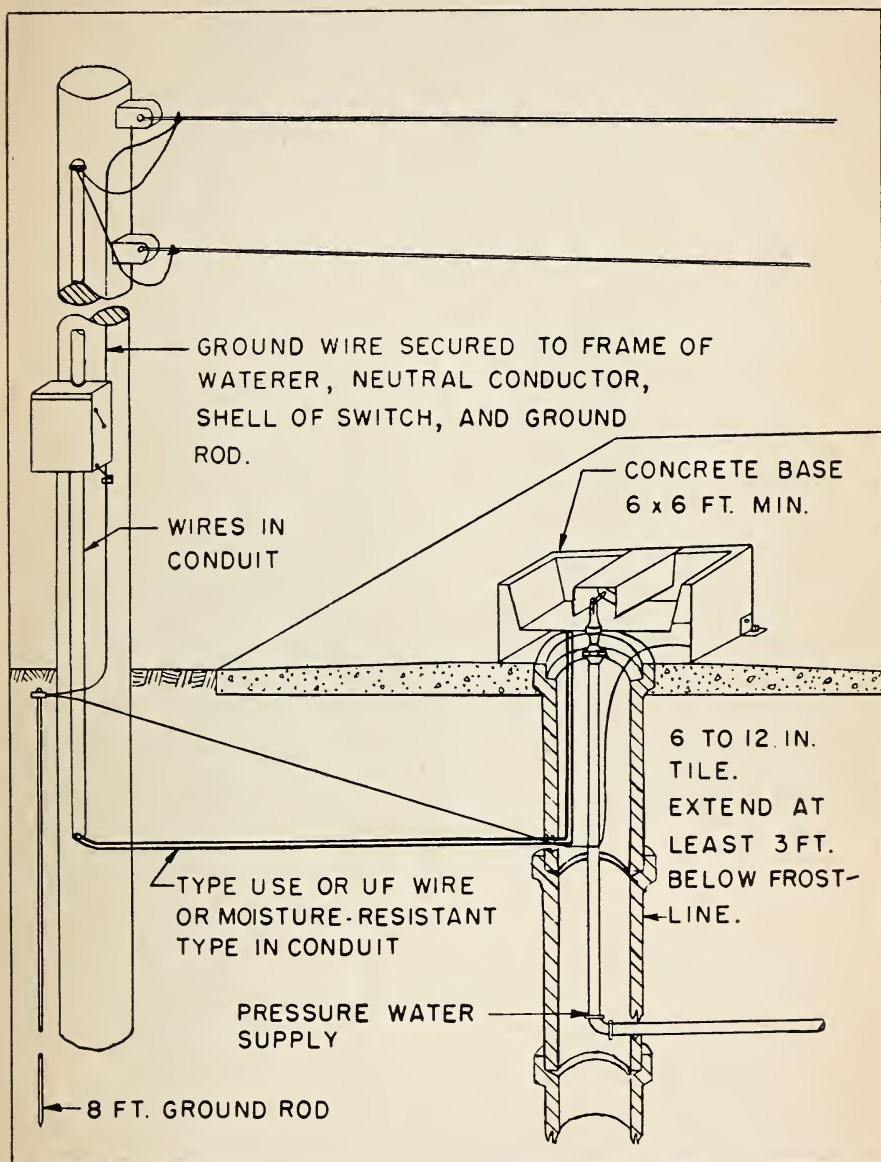
Warm air from below the frostline and from inside the waterer will surround the riser and prevent freezing.

Wiring

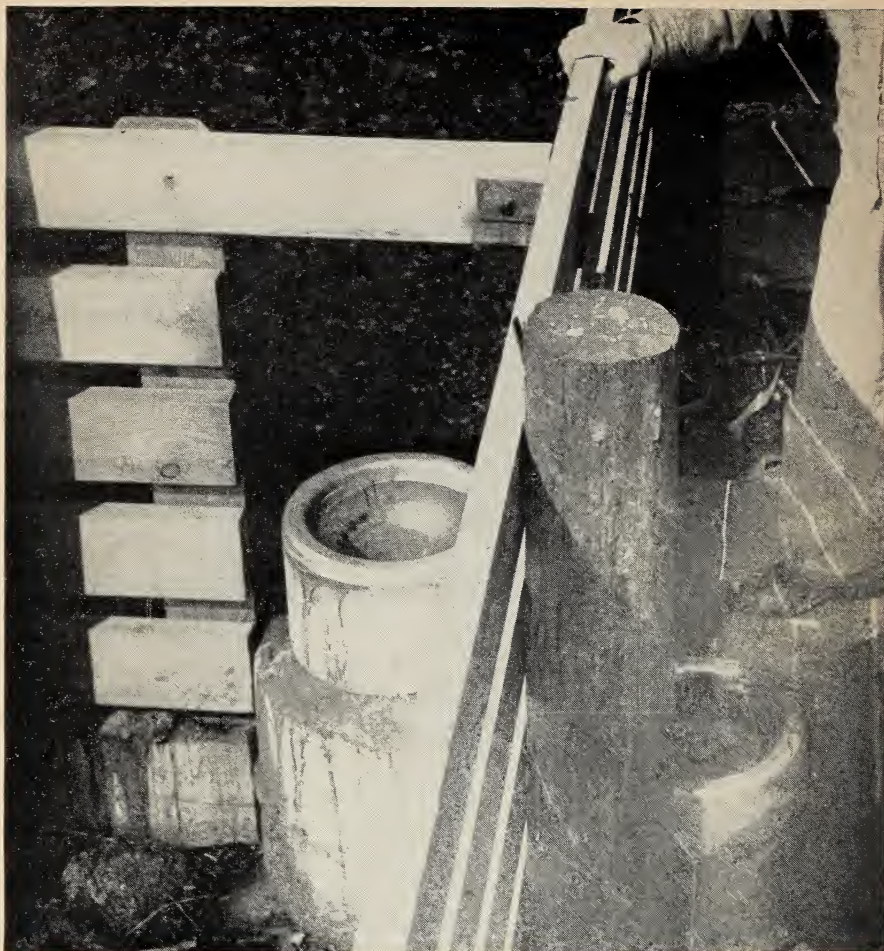
Be sure the wiring is properly installed and meets all safety requirements. Check with an electrician or your power supplier.

PROTECTION FOR ANIMALS

Place wiring in a metal conduit if it is within reach of animals.



Drawing showing installation details of typical automatic, electrically heated livestock waterer.



Automatic waterers serve cattle in two feeding lots, left, and hogs in a third lot, right.

Wiring to the waterers may be put underground if conductors approved for underground wiring are used. Such wiring should be buried at least 2 feet.

FUSING

Use a separate fused circuit for each waterer. Fuse the "hot" wire only. Use a 3- or 5-ampere fuse for hog waterers and a 10- or 15-ampere fuse for cattle waterers and combination waterers. A rule of

thumb is to use a fuse having an ampere rating $1/100$ of the wattage of the heating element when used on 115-volt lines.

GROUNDING

Proper grounding of the electrical system, the frame of the waterer, and any conducting material near the waterer—such as stanchions or a wire fence—is necessary to prevent possible injury to animals.

For grounding, you can use (1) the water pipes, if they are made of metal and not plastic; (2) a $\frac{3}{4}$ -inch galvanized steel or iron pipe; (3) a $\frac{5}{8}$ -inch steel rod; or (4) a $\frac{1}{2}$ -inch rod made of copper or other nonferrous metal. If you use a pipe or a rod for grounding, drive it 8 feet into the ground.

Connect the neutral wire of the electrical system to the water pipes or to the grounding pipe or rod. Then, using No. 6 or No. 8 copper wire, connect the frame of the waterer, and other possible conductors near the waterer, to the water pipes or to the grounding pipe or rod.

OPERATION

Maintain the water temperature no higher than is necessary to prevent surface freezing. This will usually be between 45° F. and 50° F.

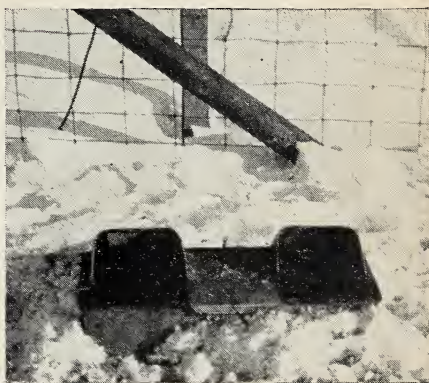
Tests at the agricultural experiment stations in Indiana, Idaho, Nebraska, and Iowa have shown that production is not increased by heating water to a temperature above that necessary to prevent freezing.

To reduce operating costs, turn the switch to the waterer off whenever air temperatures are above freezing. This can be done automatically by a thermostatically controlled cutoff switch that operates on air temperature, or it can be done by hand. If you turn the switch off by hand, be sure to turn it back on when the air temperature drops below freezing.

Be sure the thermostat is operating properly. Check the temperature of the water in the tank occasionally with a dairy thermometer, or a similar one. Have



Cattle waterer installed in the shelter of a shed to reduce operating costs.



Hog waterer with separated drinking compartments.

the thermostat adjusted if you find that the water temperature is higher than 45° F.

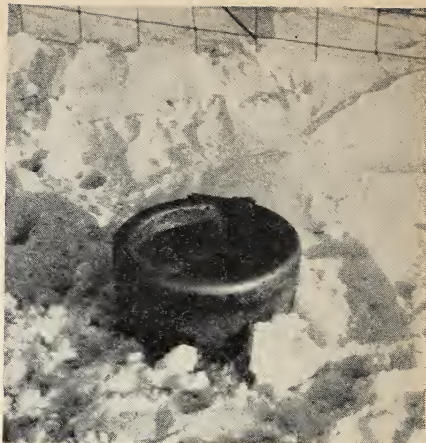
Keep the water tanks clean. Animals, especially hogs, deposit large amounts of feed in the waterers when drinking. This often leads to fermentation in the water.

COST

The cost of automatic waterers ranges from about \$40 for small units to more than \$100 for large combination units. The cost of installation depends largely on the



Bowl-type cattle waterer located at fenceline.



Bowl-type hog waterer.

distance from the installation to existing water and electric lines. Annual depreciation and maintenance charges are about 10 percent of the cost of the waterer.

The amount of electricity needed to keep a waterer free of ice depends on the size of the waterer, its location and design, severity of the winter, temperature of the incoming

water, and the amount of water.

The following shows the amount of electricity used by various types of automatic waterers during a winter season: Hog waterers, 100 to 300 kilowatt hours; cattle waterers, 500 to 700; small combination cattle and hog waterers, 700 to 1,000; large combination cattle and hog waterers, 1,000 to 2,000.

Live better, Farm better with Electricity

This leaflet was prepared by Landy B. Altman, Agricultural Engineering Research Branch, Agricultural Research Service.

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